

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-020650
(43)Date of publication of application : 24.01.1995

(51)Int.Cl.

G03G 7/00

(21)Application number : 05-166632

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(22)Date of filing : 06.07.1993

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(54) TRANSPARENT ELECTROPHOTOGRAPHIC BASE PAPER AND ITS PRODUCTION

(57)Abstract:

PURPOSE: To obtain an electrophotographic base paper excellent in dimensional stability to the humidity and without causing curling, defective electrostatic transfer or paper jamming in a thermal fixing by sticking a transparent paper on both sides of a transparent film with a radiation-curing resin cured by the irradiation with radiation.

CONSTITUTION: A transparent paper is stuck on both sides of a transparent film with a radiation-curing resin cured by the irradiation with radiation. A radiation-curing resin having $\leq 200^{\circ}\text{C}$ transition temp. is used as the radiation-curing resin. The amt. of resin to be applied is preferably controlled to 2-30g/cm² so that the adhesive strength to the transparent paper and transparent film is sufficiently maintained. Since the transparent film is interposed between the transparent papers to form a three-layer structure, the dimensional stability to humidity is improved, and the tearing strength is increased. Further, the dimensional stability and uniformity in transparency are enhanced without being affected by a solvent for adhesion and heat because of the adhesion by the irradiation with radiation.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
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3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The transparency to which this base paper for electrophotography is characterized by lamination ***** in the base paper for electrophotography with the radiation-curing nature resin which made both sides of a bright film harden a transparent paper by radiation irradiation is 50% or more of base paper for transparence electrophotography.

[Claim 2] The base paper for transparence electrophotography according to claim 1 characterized by the glass transition temperature of the radiation-curing nature resin hardened by this radiation irradiation being 200 degrees C or less.

[Claim 3] The base paper for transparence electrophotography according to claim 1 characterized by this radiation being an electron ray or ultraviolet rays.

[Claim 4] The base paper for transparence electrophotography according to claim 1 characterized by this transparent paper being tracing paper, sinking-in tracing paper, or Japanese paper.

[Claim 5] The manufacture approach of the base paper for transparence electrophotography that lamination by the electron beam irradiation of this bright film and this transparent paper is characterized by being carried out to double-sided coincidence

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the base paper for the 2nd original drawing which is especially suitable for the copying machine for large-sized drawings about the base paper for electrophotography.

[0002]

[Description of the Prior Art] This invention relates to the base paper for electrophotography for which it is especially suitable as a base paper for the 2nd original drawing in the electrophotography in the copying machine for large-sized drawings about the base paper for electrophotography. Generally as a base paper for the 2nd original drawing suitable for electrophotography, the tracing paper excellent in transparency is used. However, when tracing paper was used as a base paper for the 2nd original drawing, especially, to moisture, in the large-sized case, it was sensitive, telescopic motion of a base paper took place to it, and there was a problem of causing change to the dimension of a drawing. Although lamination ***** also exists in both sides of a bright film, tracing paper Telescopic motion partial to base materials, such as a bright film and tracing paper, in order to use a solvent in the case of lamination, Probably because the problem of the difference in a feeling of transparence arises or the heat history starts a bright film and tracing paper There was a problem that the poor electrostatic image transfer by generating of curl or the difference in the partial amount of telescopic motion and a paper jam occurred, on the occasion of heat fixing of a copy process and the copy process of a large-sized copying machine especially like the copying machine for large-sized drawings.

[0003]

[Problem(s) to be Solved by the Invention] Therefore, in the base paper for electrophotography, the technical problem which this invention tends to solve has the good dimensional stability over moisture, and it is in the case of heat fixing to obtain the base paper for electrophotography which curl, poor electrostatic image transfer, and a paper jam do not produce.

[0004]

[Means for Solving the Problem] this invention person resulted in the following invention wholeheartedly as a result of research in order to solve the above troubles. That is, it is invention of the base paper for transparence electrophotography characterized by lamination ***** with the radiation-curing nature resin hardened by both sides of a bright film by radiation irradiation in the transparent paper, and its manufacture approach.

[0005] Glass transition temperature is 200 degrees C or less, the radiation-curing nature resin hardened by radiation curing in this invention may not be restricted especially as long as it forms the three-dimensional structure after hardening, and it may depend what also depends the hardening approach on ultraviolet rays, electron-beam irradiation independence, or combination on concomitant use with other

polymerization methods. When resin, for example, the adhesion emulsion resin, acrylic adhesion resin, or hot melt adhesive other than radiation hardenability resin etc. is used, curl occurs and a paper jam tends to happen. Moreover, although generating of curl can control the manufacture approach as much as possible if the lamination of a bright film and a transparent paper is lamination ***** at double-sided coincidence, lamination ***** is sufficient at a time as the 1st page serially.

[0006] The detail of this invention is explained below. In this invention, transparency calls a transparent paper 40% or more of paper. The transparent paper used for this invention is not restricted especially if transparency is 40% or more of thing, and wood pulp, a synthetic pulp, a loading material, a sizing compound, a paper reinforcing agent, its color, etc. are possible for using the raw material usually used by paper making if needed.

[0007] Although anything can be used as a bright film used for this invention, it is desirable to use polyester excellent in thermal resistance, especially biaxial-stretching polyester film.

[0008] It will not restrict, especially if glass transition temperature is radiation-curing nature resin 200 degrees C or less as radiation-curing nature resin hardened by the radiation irradiation used for this invention. If glass transition temperature is higher than 200 degrees C, the flexibility of the base paper for electrophotography will be lost and a paper jam will occur at a heat fixing process. as radiation hardenability resin -- a molecule end -- or the polymer which has the unsaturated polyester which has the functional group of radical polymerization hardenability in a molecule side chain, denaturation unsaturated polyester, an acrylic polymer, and an ethylene unsaturated bond, a monomer, etc. -- a simple substance -- or it can be used with other solvents. For example, polyester polyacrylate, polyester polymethacrylate, polyurethane polyacrylate, polyurethane polymethacrylate, monofunctional acrylate, monofunctional methacrylate, vinyl pyrrolidone, polyamide polyacrylate. Polyamide polymethacrylate, polysiloxane polyacrylate or the oligo ester denaturation object of these resin, an alkylene oxide denaturation object, etc. are mentioned. These resin may be used independently, and it may be used, mixing.

[0009] Although the coverage of radiation-curing nature resin is not limited, it is [m] within the limits of 2-30g/m² 2g /preferably from the purpose which fully maintains the bond strength of a transparent paper and a bright film. When the coverage of radiation-curing nature resin is smaller than this range, sufficient adhesive property cannot be taken out with a transparent paper and a bright film, but bulging of a transparent paper may arise at a heat fixing process, and a paper jam may occur.

Moreover, the transparency of the base paper for electrophotography may be lost as it is larger than this range.

[0010] As an approach of applying the radiation hardenability resin of this invention, what kind of coating machines, such as a gravure coating machine, a gravure offset coating machine, a bar coating machine, a roll coater, an air knife coating machine, U comma coating machine, an AKKU coating machine, a smoothing coating machine, a micro gravure coating machine, a reverse roll coater, 4 or 5 roll coaters, a blade coating machine, a dip coater, a fall curtain coating machine, a slide coating machine, a die coating machine, and a squeeze coating machine, may be used.

[0011] In the case of the double-sided coincidence lamination approach, one by one, spreading of radiation-curing nature resin is good in a line, and you may perform it the 1st page at a time to double-sided coincidence. When lamination is performed to double-sided coincidence, the base paper for transparence electrophotography of completion has good curl nature, and it is [the curl nature after a copy] good. Moreover, transparency is suitable for 50% or more of thing as a base paper for the 2nd original drawing, and if the base paper for transparence electrophotography has transparency lower than 50%, it is more unsuitable than the use application of the 2nd original drawing.

[0012] The field of penetrating power and the hardening force to acceleration voltage is 100-1000kV, and, as for the electron beam irradiation used for this invention, it is desirable more preferably to make it the absorbed dose of one pass set to 0.5 - 20Mrad using a 100-300kV electron ray accelerator. If acceleration voltage or the amount of electron beam irradiation is lower than this range, the penetrating power of an electron ray will be too low, sufficient hardening will not be performed, and if too larger than this range, energy efficiency not only gets worse, but the effect which is not desirable will appear on [, such as disassembly of resin and an additive, and a fall of a base material on the strength,] quality.

[0013] As an electron ray accelerator, any, such as an electro curtain system, a scanning type, and a doubles canning type, are sufficient, for example.

[0014] In addition, since hardening of electron ray hardenability resin will be barred on the occasion of electron beam irradiation if an oxygen density is high, the permutation by inert gas, such as nitrogen, helium, and a carbon dioxide, is performed, and it is 600 ppm about an oxygen density. It is 400 ppm preferably hereafter. Irradiating in the ambient atmosphere controlled below is desirable.

[0015] In this invention, radiation-curing nature resin can be hardened by UV irradiation if needed. As a black light to be used, there are a low pressure mercury lamp,

a medium-voltage mercury-vapor lamp, a high pressure mercury vapor lamp, a metal halide lamp, etc., and there is also an ozone loess type with little ozone generating, for example. Generally the lamp of 80 or more w/cm of outputs is used in parallel two or more.

[0016] As a photoinitiator used when hardening by UV irradiation in this invention, there are JI and the acetophenones like a TORIKURORO acetophenone, a benzophenone, a Michler's ketone, benzyl, a benzoin, benzoin alkyl ether, benzyl dimethyl ketal, tetramethylthiuram monosulfide, thioxan tons, an azo compound, etc., and it is chosen from viewpoints, such as a type of the hardening reaction of hardenability resin, stability, and fitness with a black light. The amount of the photoinitiator used is usually 0.1 - 5% of range to ultraviolet-rays hardenability resin. Moreover, a storage stabilizer like hydroquinone may be used together by the photoinitiator.

[0017] As a sensitizer used for this invention, there are a fatty amine, amine [containing an aromatic series radical], nitrogen heterocyclic compound, allyl compound system urea, O-tolyl thiourea, sodium diethyl dithiophosphate, fusibility salt [of an aromatic series sulfinic acid], N, and N-JI permutation-P-amino benzonitrile system compound, tri-n-butyl phosphine, sodium diethyl thio phosphate, a Michler's ketone, an N-nitroso hydroxylamine derivative, an oxazoline compound, a carbon tetrachloride, hexachloroethane, etc., and, generally improvement in a cure rate can be measured by using with a photoinitiator in common.

[0018]

[Function] Since the base paper for electrophotography of this invention is the three-tiered structure to which the laminating of the bright film was carried out between transparent papers, its dimensional stability over moisture is good, and its tear reinforcement is high, and the feeling of homogeneity of dimensional stability or transparency is good, without influencing a base material of a solvent or heat, since adhesion by radiation irradiation is performed in the adhesion process of a bright film and a transparent paper, and telescopic motion of a base paper cannot take place easily in the case of heat fixing of a copy process. Since the glass transition temperature of the radiation-curing nature resin hardened by radiation irradiation is 200 degrees C or less, an adhesive property is good, and curl cannot take place easily, and telescopic motion of a partial base paper does not occur. For this reason, it can be used as a base paper for transparence electrophotography which does not cause a paper jam.

[0019]

[Example] Next, although an example explains this invention to a detail further, the

contents of this invention are not restricted to an example. .

[0020] as example 1 bright film -- both sides of a polyethylene terephthalate film with a thickness of 12 micrometers -- 2 Rolls Royce quiz coating machine -- using -- as radiation-curing nature resin -- electron ray hardenability resin (the Toagosei chemical-industry incorporated company make --) After applying ARONIKKUSU M-1210 and the glass transition temperature of 15 degrees C so that the coverage of each side may serve as 6 g/m², and laying on top of the tracing paper and double-sided coincidence of 18 g/m² as a transparent paper, with the acceleration voltage of 200kV Electron beam irradiation was carried out, resin was stiffened so that it might become the absorbed dose of 3Mrad(s), and the base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained.

[0021] as example 2 bright film -- one side of a polyethylene terephthalate film with a thickness of 12 micrometers -- a gravure offset coating machine -- using -- as radiation-curing nature resin -- electron ray hardenability resin (the Toagosei chemical-industry incorporated company make --) ARONIKKUSU M-240 and the glass transition temperature of 50 degrees C are applied so that spreading weight may serve as 4 g/m². As a transparent paper with the tracing paper of 18g/m², superposition, and the acceleration voltage of 200kV Electron beam irradiation was carried out, resin was stiffened so that it might become the absorbed dose of 3Mrad(s), and the sheet which carried out the laminating of the tracing paper to one side of polyethylene terephthalate was obtained. The laminating of the tracing paper was similarly carried out to the above as a transparent paper in the tracing paper and the opposite side of this sheet, and the base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained.

[0022] as example 3 bright film -- one side of a polyethylene terephthalate film with a thickness of 12 micrometers -- a gravure coating machine -- using -- as radiation-curing nature resin -- ultraviolet-rays polymerization nature urethane resin (the Toagosei chemical-industry incorporated company make --) After applying and carrying out UV irradiation and carrying out precuring of ARONIKKUSU UV 3400 and the glass transition temperature of 15 degrees C so that coverage may serve as 2 g/m² The tracing paper of 8 g/m², and superposition and the sheet which performed UV irradiation from on tracing paper further, and carried out the laminating of the tracing paper to one side of polyethylene terephthalate were obtained as a transparent paper. The laminating of the tracing paper was similarly carried out to the above as a transparent paper in the tracing paper and the opposite side of this sheet, and the base

paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained.

[0023] The base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained like the example 1 except having changed example 4 radiation hardenability resin into 2 and 4-dichlorophenyl acrylate (glass transition temperature being 60 degrees C).

[0024] The base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained like the example 1 except having changed example 5 spreading weight into 30 g/m².

[0025] The base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained like the example 1 except having changed example 6 transparent paper into the tracing paper of 72g/m².

[0026] The base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and sinking-in tracing paper was obtained like the example 1 except having changed example 7 transparent paper into the sinking-in tracing paper of 18 g/m².

[0027] The base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and Japanese paper was obtained like the example 1 except having changed example 8 transparent paper into the Japanese paper of 18 g/m².

[0028] The base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained like the example 1 except having changed example 9 radiation-curing nature resin into ARONIKKU M-215 (glass transition temperature of 166 degrees C) by Toagosei chemical-industry incorporated company.

[0029] The base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained like the example 1 except having changed example 10 radiation hardenability resin into trimethylolpropane triacrylate (glass transition temperature of 250 degrees C or more).

[0030] The base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained like the example 1 except having changed ARONIKKU M-215 (glass transition temperature of 166 degrees C) by Toagosei chemical-industry incorporated company, and trimethylolpropane triacrylate (glass transition temperature of 250 degrees C or more) into what mixed example 11 radiation-curing nature resin to 1 to 1 by the weight

ratio (glass transition temperature of 200 degrees C).

[0031] It considers as the example of a comparison of the base paper for transparence electrophotography with 160g of examples of a comparison/, and the tracing paper of m2.

[0032] The gravure offset coating machine was used for one side of a polyethylene terephthalate film with an example of comparison 2 thickness of 12 micrometers, and after applying and carrying out predrying of the solvent system resin (Konishi vinyl-acetate-resin system solvent type adhesive, bond K10) so that spreading weight may serve as 4 g/m2, the tracing paper of 18g/m2, and superposition and the sheet which carried out hot air drying and carried out the laminating of the tracing paper to one side of polyethylene terephthalate were obtained. The laminating of the tracing paper was similarly carried out to the above in the tracing paper and the opposite side of this sheet, and the base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained.

[0033] The base paper for transparence electrophotography was obtained like the example 2 of a comparison except having replaced the acrylic adhesion resin of the example 2 of example of comparison 3 comparison with adhesion emulsion resin (the Konishi make, bond 720).

[0034] The tracing paper of a hot-melt-adhesive layer, 18g/m2 was contacted, and the heat press was performed, it unified [polyolefine system hot melt adhesive (the Yokohama Rubber make HAMATAITO M470) was applied to one side of a polyethylene terephthalate film with an example of comparison 4 thickness of 12 micrometers, and], and the sheet which carried out the laminating of the tracing paper to one side of

~~polyethylene terephthalate was obtained. The laminating of the tracing paper was~~
similarly carried out to the above in the tracing paper and the opposite side of this sheet, and the base paper for transparence electrophotography which consists of a three-tiered structure of polyethylene terephthalate and tracing paper was obtained.

[0035] Not all the base papers for electrophotography obtained by the above example and the example of a comparison had the adhesive agent of curl and a bright film, and a transparent paper, and were good.

[0036] Dimensional stability over test method humidity .. After drawing a straight line with a die length of 250.0mm to the base paper for transparence electrophotography which carried out gas conditioning to the temperature of 20 degrees C, and 65% of humidity, Gas conditioning was carried out to the temperature of 20 degrees C, and 85% of humidity, the linear die length was measured, and more greatly than good and $\pm 0.2\text{mm}$, the difference, the first die length, judged the thing $\pm 0.4\text{mm}$ or less to be the average, and judged the thing $\pm 0\text{mm}$ or more $\pm 0.2\text{mm}$ or less that a larger thing than

**0.4mm is poor.

[0037] Dimensional stability .. The original drawing was copied to the base paper for transparence electrophotography, and the original drawing before copying the drawing after a copy and viewing compared, and the thing without gap of a drawing was judged to be good, and it judged that the big thing of the gap of the average and a drawing by a certain thing is poor a little.

[0038] Curl nature .. The base paper for transparence electrophotography which copied the original drawing was judged for 40cm around, it put on the flat desk under 20 degrees C and conditions of 65% of relative humidity, and curl was measured. Curl was expressed with the average of the lifting height of four corners, and since curl **** and larger curl than 7mm became trouble when printing at the rear face, the case where the curl average was less than 3mm was judged even for curl **** and 3mm - 7mm as curl ****.

[0039] Paper jam .. The electrophotography copy of an original drawing was performed by 100-sheet continuation, and what caused good and a paper jam for what a paper jam did not produce at all judged the thing of two or less sheets that the average and the thing of two or more sheets are poor.

[0040] Transparency .. It expressed with 100 (hunter opacity value). In addition, hunter opacity is JIS. It is the opacity (%) measured based on P8138.

[0041]

[Table 1]

	湿度に対する 寸法安定性	寸法安定性	カール性	紙詰まり	透明度
実施例 1	良	良	優	良	68
実施例 2	良	良	並	良	66
実施例 3	並	並	優	良	65
実施例 4	良	良	優	良	66
実施例 5	良	良	優	良	66
実施例 6	良	良	優	良	60
実施例 7	良	良	優	良	63
実施例 8	良	良	優	良	66
実施例 9	良	良	優	良	69
実施例 10	良	良	並	良	66
実施例 11	良	良	優	並	64
比較例 1	不良	並	優	並	66
比較例 2	並	並	劣	並	63
比較例 3	並	並	劣	並	63
比較例 4	並	並	劣	並	60

[0042] Evaluation .. Dimensional stability [as opposed to humidity by work of a bright film] was good, and the dimensional stability at the time of a copy was good, since adhesion by radiation irradiation was used for the base paper for electrophotography of this invention, there was no effect of the heat history or a solvent in a base material, it

had neither a feeling of transparency, nor the feeling of an ununiformity of elasticity, its curl nature was good, and its transparency which a paper jam does not generate was high so that clearly from the result of a table 1. If the glass transition temperature of the radiation-curing nature resin which forms an interlayer was higher than 200 degrees C, since the flexibility of the base paper for electrophotography would be lost, there was an inclination which a paper jam generates. On the other hand, in the example 1 of a comparison which has not prepared the interlayer and the bright film, the dimensional stability over humidity is bad. Although considered because a solvent is used at the time of lamination with a bright film or the heat history is given to it in the examples 2-4 of a comparison, the curl nature after an electrophotography imprint was not good.

[0043]

[Effect of the Invention] The dimensional stability over humidity is good, and the dimensional stability at the time of a copy is also good, a paper jam did not occur, but the base paper for electrophotography of this invention can obtain the base paper for electrophotography usable as the 2nd original-drawing base paper with good high transparency of the curl nature after a copy, and was that worthy on industry so that clearly from the result of Table 1.

(12) 公開實用新案公報 (U)

(11) 實用新案出願公開番号

実開平7-20650

(43)公開日 平成7年(1995)4月11日

(51) Int.Cl.⁸
G 0 6 K 19/07

識別記号 庁内整理番号

FI

技術表示箇所

G O 6 K 19/ 00

J

H

審査請求 未請求 請求項の数 2 O.L (全 2 頁)

(21)出願番号 実願平5-50637

(22)出願日 平成5年(1993)9月17日

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[最終頁に続く](#)

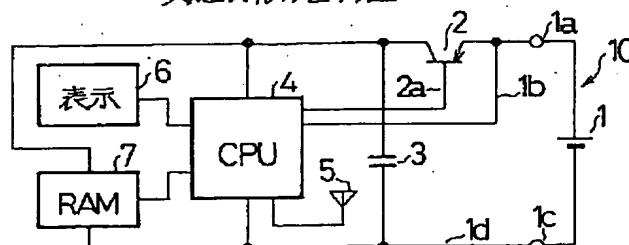
(54)【考案の名称】 非接触型 IC カード

(57) 【要約】

【目的】 常時はもちろんのことカード破損時等においても所要のデータを容易に知ることができる非接触型 ICカードを提供する。

【構成】 電池 1 の接触不良、消耗等により、電源端子 1 a、1 c 間の電圧が IC カードの動作に支障がある値まで低下したとき、信号処理部 4 はこの電圧低下を検出してトランジスタ 2 をオフする。その後、信号処理部 4 はコンデンサ 3 を電源としてメモリ性表示器 6 に“使用不能”等の表示を行い、IC カード読取書込装置との通信を禁止する等の所定の非常処理を行う。ポイント数、残高等の所要のデータの表示は、表示器 6 のメモリ性により永続的に保持される。IC カード破損の際にも同様に所要のデータの表示は保持される。

実施例1のブロック図



(2)

I

2

【実用新案登録請求の範囲】

【請求項1】 電池と、この電池に電源端子およびスイッチ手段を介して接続されたコンデンサと、このコンデンサを電源とする信号処理手段と、この信号処理手段で駆動されポイント数、残高等の所要のデータを表示する表示手段とを備えた非接触型ICカードであって、前記信号処理手段は、前記電源端子の電圧が所定値以下に低下したとき前記スイッチ手段を開路するものであることを特徴とする非接触型ICカード。

【請求項2】 表示手段は、電圧印加なしで永続的に表示内容を保持するものであることを特徴とする請求項1

記載の非接触型ICカード。

【図面の簡単な説明】

【図1】 実施例1のブロック図

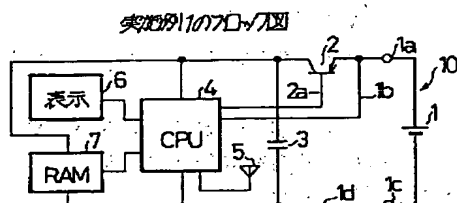
【図2】 関連技術例のブロック図

【図3】 従来例のブロック図

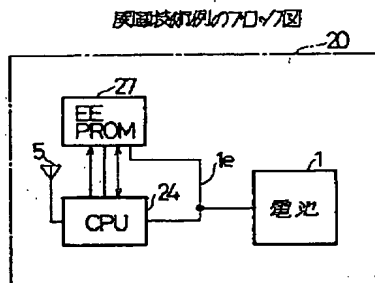
【符号の説明】

- 1 電池
- 2 トランジスタ
- 3 コンデンサ
- 4 信号処理部
- 6 メモリ性表示器

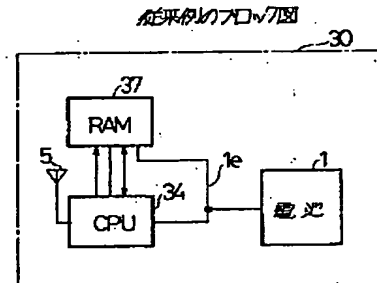
【図1】



【図2】



【図3】



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(3)

【考案の詳細な説明】

【0001】

【産業上の利用分野】

本考案は、非接触型 I C カードに関し、特にそのデータ保存に関するものである。

【0002】

【関連の技術】

I C カードは、大別すると、I C カード読取書込装置と接触状態で信号の送、受を行う接触型と、非接触状態で信号の送、受を行う非接触型となる。

【0003】

接触型 I C カードは、通常、I C カード読取書込装置と電気接続される 6 ～ 8 個の外部接続端子を有し、その一部の端子を介して I C カード読取書込装置から電源供給を受け、所要の信号処理を行っている。そのため I C カード内には電源が内蔵されておらず、信号処理後のデータは、I C カード内蔵の、電氣的に書替え可能な不揮発性メモリである E E P R O M (Electrically Erasable PROM) に保存される。

【0004】

一方、非接触型 I C カードでは、通常、I C カード読取書込装置から電源供給されず、I C カード自体にコイン型電池等の小型電池を電源として内蔵している。

【0005】

図 3 はこのような従来の非接触型 I C カードの概略的構成を示すブロック図である。図において、5 はアンテナで、不図示の I C カード読取書込装置と電波により信号の送、受を行う。3 4 は C P U を核とする信号処理部で、アンテナ 5 からの信号から取り出したデータ、R A M (Random Access Memory) 3 7 のデータ等を、内蔵のプログラムにしたがいデータ処理し、所要のデータを R A M 3 7 に記憶させると共に、アンテナ 5 を介して所要のデータを I C カード読取書込装置へ送る。1 は電池で、信号処理部 3 4、R A M 3 7 に電源線 1 e を介して電源供給を行う。R A M 3 7 では、この電池 1 による電源供給によりメモリ内容が保持さ

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れている。

【0006】

しかし、図3に示すような非接触型ICカードでは、電池の接触不良、消耗、何らかの原因によるICカードの破損等の際、RAMに保存中のデータが全て消滅するおそれがある。

【0007】

そこで本出願人は、電池を内蔵する非接触型ICカードでありながら、図2に示すように、メモリにRAMのかわりにEEPROM等の書込み可能なROM27を用い、前述のような際に、データが消滅しない非接触型ICカードを別途提案（実願平5-40092号）している。

【0008】

【考案が解決しようとする課題】

図2に示すような非接触型ICカードでは、何らかの原因でICカード読取書込装置で読取り不能となっても所要のデータは書込み可能なROM内に一応保存されている。

【0009】

そこで電池の接触不良、消耗が原因のときは、接触状態を改善し、或は電池を交換することにより、ICカード読取書込装置で容易に所要のデータを読み取ることができる。

【0010】

しかしながら、ICカードの破損が原因のときは、ICカード内に埋め込まれている書込み可能なROMの端子を慎重に露出させて所要のデータを読み取らなければならない、作業能率が悪いという問題がある。またROMがCPUと一体に形成されているときは、読出しのための所要の線を露出させることが困難で読出し不能になるという問題がある。

【0011】

一方、ICカードを磁気カードと同様に、ポイントカード、プリペイドカード等に利用することが考えられているが、非接触式ICカードでは、ICカード読取書込装置で読み書きする際にカード面にポイント数、残高等をプリントするこ

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とができず、ユーザはICカードだけではポイント数、残高等を知ることができないという問題がある。

【0012】

本考案は、このような問題を解消するためになされたもので、常時はもちろんのことカード破損時等においても所要のデータを容易に知ることのできる非接触型ICカードを提供することを目的とするものである。

【0013】**【課題を解決するための手段】**

前記目的を達成するため、本考案では、非接触型ICカードを次の(1)、(2)のとおりに構成する。

【0014】

(1) 電池と、この電池に電源端子およびスイッチ手段を介して接続されたコンデンサと、このコンデンサを電源とする信号処理手段と、この信号処理手段で駆動されポイント数、残高等の所要のデータを表示する表示手段とを備えた非接触型ICカードであって、前記信号処理手段は、前記電源端子の電圧が所定値以下に低下したとき前記スイッチ手段を開路するものである非接触型ICカード。

【0015】

(2) 表示手段は、電圧印加なしで永続的に表示内容を保持するものである前記(1)記載の非接触型ICカード。

【0016】**【作用】**

前記(1)、(2)の構成により、ポイント数、残高等の所要のデータは表示手段に表示されている。何らかの原因で電源端子電圧が所定値以下に低下すると、電池はカットオフされるが、所要のデータは表示手段に表示されている。前記(2)の構成では、電源端子電圧の低下、ICカードの破損等にかかわらず、表示手段の所要のデータの表示は永続的に保持される。

【0017】**【実施例】**

以下本考案を実施例により詳しく説明する。

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【0018】

(実施例1)

図1は実施例1である“非接触型ICカード”の概略的構成を示すブロック図である。

【0019】

図において、1は小型電池で、ICカード本体の電源端子1a, 1c間に挟持されている。2は電池カットオフ用のトランジスタ、3はコンデンサ、4はCPUを核とする信号制御部、5はアンテナ、6は電圧印加なしで永続的に表示内容を保持する表示器（以下メモリ性表示器という）、7はRAMである。10は電池1を内蔵する本実施例の非接触型ICカードを指す。

【0020】

信号制御部4は、ライン1b, 1dを介して電池1の電圧を取り出し、この電圧が、ICカード10の動作に支障のない値のときは、ライン2aにトランジスタ2のベース電流を流させ、トランジスタ2をオン状態に維持しコンデンサ3を電池1の電圧に近い電圧値に維持する。

【0021】

ICカード10は、このコンデンサ3を電源としアンテナ5を介して不図示のICカード読取書込装置と電波により信号の送受を行う。

【0022】

信号処理部4はアンテナ5からの信号から取り出したデータ、RAM7のデータ等を、内蔵のプログラムにしたがいデータ処理し、所要のデータをRAM7に記憶させ、ポイント数、残高等の所要のデータをメモリ性表示器6に表示させ、アンテナ5を介して所要のデータをICカード読取書込装置に送る。メモリ性表示器6は、パルス電圧により表示が変更され、その後表示内容は無電圧で保持される。一方、RAM7のメモリ内容は電池1による電源供給により保持される。

【0023】

何らかの原因でライン1b, 1d間の電圧値が、ICカード10の動作に支障が生ずる値まで低下すると、信号処理部4は、この電圧低下を検出し、ライン2aの電流をオフしトランジスタ2をオフして電池1をカットオフする。その後、

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信号処理部 4 は、コンデンサ 3 を電源とし、メモリ性表示器 6 に“使用不能”等の表示を行い、IC カード読取書込装置との交信を禁止する等の所定の非常処理を行う。

【0024】

このように動作するので、常時表示器により所要データを知ることができ、また電池電圧の低下により IC カード 10 の動作が不安定になって誤動作することがない。更に電池の接触不良、消耗、或は IC カードの破損等が起きてもメモリ性表示器 6 にポイント数、残高等の所要のデータが保持されているので、所要のデータを容易に知ることができる。

【0025】

コンデンサ 3 は、前述の非常処理の間、単独で電源供給できるだけの容量があれば足りるので、小型、小容量のものでよい。

【0026】

メモリ性表示器 6 としては、電気泳動表示セル、エレクトロクロミック表示セル等がある。電気泳動表示セルは、溶液中の顔料または染料が電界により移動する現象を利用するもので、顔料、染料は電圧を取り去っても、電極面にファンデル・ワールス力によって付着し残っており、記憶作用がある。またエレクトロクロミック表示セルは、電気化学的な酸化還元反応による着色消色現象を利用するもので、化学反応のため電圧を取り去ってもそのままの状態が維持され記憶作用がある。

【0027】

(実施例 2)

本実施例は、非メモリ性表示器である液晶表示器を用いるものである。全体の構成、動作は図 1 と同様である。

【0028】

液晶表示器として一般的なねじれネマチック方式のものを用いる。この表示器自体は、低電圧、低電力で数 μA の消費電流ですむ。しかし、液晶表示器は電気化学反応を避けるため交流駆動する必要があり、信号処理部 4 に低消費電力の CMOS 素子を用いたとしても数 $10 \mu A$ の電流を要する。

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【0029】

これに対処するため、コンデンサ3としてはファラッドオーダーの大容量が容易に得られる電気2重層コンデンサを用いる。

【0030】

この構成により、何らかの原因で電源端子1a, 1cの電圧がICカードの動作に支障のある値にまで低下したときは、電池1がカットオフされ、その後、コンデンサ3を電源として、信号処理部4により、液晶表示器に“使用不能”等の表示を行う、ICカード読取書込装置との交信を禁止する等の所定の非常処理が行われる。

【0031】

このように動作するので、常時表示器により所要のデータを知ることができ、また電池電圧の低下に伴う誤動作を避けることができる。更に電池の接触不良、消耗等が起きても、短期間は液晶表示器にポイント数、残高等が表示されているので、所要のデータを容易に知ることができ、必要な緊急処置をとることができる。

【0032】

【考案の効果】

以上説明したように、本考案によれば、常時、表示手段によりポイント数、残高等の所要のデータを知ることができ、電池電圧の低下に伴う誤動作を避けることもできる。更に電池の接触不良、消耗或はICカードの破損等が起きても所要のデータを表示手段により容易に知ることができる。